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THE
ONTARIO WATER RESOURCES
COMMISSION

WATER POLLUTION SURVEY

of the

SEPARATED TOWN OF INGERSOLL

COUNTY OF OXFORD

1966

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SEPARATED TOWN OF INGERSOLL
1966
COUNTY OF OXFORD

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Report on a water pollution
survey of the separated town of
Ingersoll, county of Oxford.

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REPORT

ON A

WATER POLLUTION SURVEY

OF THE

SEPARATED TOWN OF INGERSOLL

COUNTY OF OXFORD

JUNE 27 and 28, 1966

DIVISION OF SANITARY ENGINEERING

ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

A water pollution survey was made in the Separated Town of Ingersoll on June 27 and 28, 1966. The purpose of the survey was to record all significant sources of water pollution within the town. The surveys are performed routinely, and upon request by the Division of Sanitary Engineering of the Commission as a basis for evaluating all existing and potential sources of pollution. Where such polluting materials are found, corrective action is requested by the Commission.

Information pertinent to the survey was provided by Mr. C.V. MacLachlan, Manager, Public Utilities Commission and assistance in the sampling programme was given by Mr. R.G. Quance, Engineer's Assistant, OWRC, and Mr. G. Griffith, Public Health Inspector, Oxford Health Unit.

RECOMMENDATION OF PREVIOUS SURVEY AND ACTION TAKEN

The previous water pollution survey in the town of Ingersoll was conducted by the OWRC on November 27, 1963. This survey resulted from investigations of sanitary conditions of the Thames River. It was noted that sanitary and industrial wastes were being discharged into the Thames River and tributaries without adequate treatment. It was recommended in this report that municipal officials take steps to eliminate sanitary and industrial

waste from the storm sewers. The industries contributing to the pollution of the Thames River and tributaries, were also to be contacted by the municipality, and advised to correct their pollution problems.

The Industrial Waste Branch has these industries under inspection and some corrective action has been taken. Approval has been granted for treatment facilities to serve the pickling plant of the Morrow Screw and Nut Company Limited. Since the previous OWRC survey, approval has also been granted for extension of sanitary sewers in various sections of the town.

GENERAL INFORMATION

The Separated Town of Ingersoll, with a 1965 assessed population of 7,197 (1966 Municipal Directory), is located on Highway #2, in the westerly portion of the County of Oxford.

The town is situated on the Thames River approximately 150 miles from the river mouth. In general, all drainage waters in the municipality drain to the Thames River. There are five tributary streams which flow through the town and discharge to the river within the corporate limits.

All of the storm sewers, private drains and open ditches in the town discharge to the tributary streams or directly to the Thames River.

WATER USES

Municipal Water System

Water for the Town of Ingersoll is provided from three plants, each utilizing ground water as a source of supply. Because of the hydrogen sulphide content in the water, aeration is provided at each plant. The only other form of treatment provided, is chlorination at the West Oxford Pumphouse. The average daily water consumption for the town is approximately 806,906 gallons. Based on a population of 7,107, this indicates a per capita consumption of 114 gpcd.

Industrial Water Supplies

The industries in the Town of Ingersoll utilize the municipal water supply for processes.

WATER POLLUTION CONTROL

Sanitary Waste Disposal

The major portions of the developed areas in the municipality, including industrial, commercial and residential properties, are serviced by sanitary sewers and a conventional activated sludge plant. The plant is designed to provide complete treatment for sewage flow of 0.75 million gallons per day. The plant effluent is discharged to the Thames River.

Properties not serviced by sanitary sewers use septic tank and field tile systems.

Storm Sewers

Storm sewers are presently discharging at various points to watercourses which traverse the town. It was indicated by the samples collected during the survey that a number of homes are discharging untreated or partially treated wastes to the storm sewers causing contamination in the watercourse.

REFUSE DISPOSAL

The disposal site is located near the former course of the Thames River, South Branch, in the west section of the municipality. A sample collected adjacent to the refuse disposal area (T 149.51-I) revealed that the site did not constitute a pollution problem at the time of the survey. It was reported that the old bed of the stream will eventually be filled and converted into a community park.

INDUSTRIAL WASTE DISPOSAL

A by-law has been instituted by the town governing the discharge of industrial wastes to the public sewers.

The bulk of industrial processing wastes is being discharged into the sanitary sewer system. It was reported, however, that wastes from some manufacturing operations were discharged at times into the storm sewer system. At the time of the survey, waste outfalls of the Morrow Screw and Nut Company, Canadian Industries Limited, Ingersoll Machine and Tool Company and the Borden Company were discharging polluting materials into the watercourses.

Subsequent to the inspection, the Ontario Water Resources Commission approved installation, by Morrow Screw and Nut Company, of a treatment system to serve its pickling plant at Ingersoll. This system is to be completed in August. Also the Ingersoll Machine and Tool Company was going to ascertain if it would be possible to dispose of their wastes in the municipal sewage system as suggested by the Industrial Waste Division. The Borden Company Milk Plant discharges an average of 20,000 gallons per day of wastewater into the municipal sewage system. The excessive BOD concentration from the sample collected at T 149.6-I, suggest that some milk waste was apparently being discharged with the cooling water flowing to the Thames River.

WATER QUALITY ANALYSES

Samples were collected where possible, from the flow at the outfall of all drains and sewers in order to assess the degree of pollution from the Town of Ingersoll being discharged into adjacent watercourses.

The laboratory results of the bacteriological examinations and the chemical analyses of the samples collected are listed in Table I. The location of the sampling points are indicated on the accompanying map.

INTERPRETATION OF ANALYSIS

For convenience in the interpretation of laboratory analyses, the Ontario Water Resources Commission water quality

objectives for surface-water drains, watercourses and bodies of water are listed below:

Biochemical Oxygen Demand (BOD)

BOD is an indication of the amount of oxygen required by bacteria for the stabilization of decomposable organic matter present in sewage, polluted waters, or industrial waste. This parameter is usually expressed in parts per million (ppm). The BOD test is widely used to determine the pollutational strength of sewage and industrial waste in terms of the oxygen that they will require if discharged into natural watercourses. Laboratory tests are conducted over a period of controlled incubation. The usual incubation period is 5 days at a temperature of 20° C. A high BOD is indicative of organic or chemical pollution. If toxic materials are present at the time of the analyses, the validity of the test is questionable. The OWRC 5-Day objective for surface water drains is not greater than 15 ppm and for watercourses and bodies of water it is 4 ppm.

Total Suspended and Dissolved Solids

Suspended solids determinations indicate the amount of undissolved solids of organic or inorganic nature, while dissolved solids are a measure of materials in solution. The two added give a total indication of the amount of solids in the liquid. Determination of the amounts of dissolved and undissolved matter is accomplished by making tests upon filtered

and unfiltered portions of the samples. A recommended maximum limit of suspended solids of not greater than 15 ppm is suggested. This is due to the fact that suspended solids in excess of this amount affect purification and are injurious to the habitant of fish.

Bacteriological Examination

A membrane filter (MF) count of less than 2,400 coliform organisms is considered desirable for bacteriological quality of surface water in Ontario. Coliform organisms are reported per 100 millimeters (ml) of sample, and indicates bacteriological contamination by human or animal excrement.

Phenols

Phenolic compounds are present in the waste flows from many industrial processes. They are usually expressed in parts per billion (ppb). Phenol occurs as a natural component from the coal-gas, coal-cooking, and petroleum industries as well as in a wide variety of industrial waste from processes involving the use of phenol as a raw material. Depending on the concentration, the presence of these materials could be toxic to fish, but may serve as a bacterial food without serious toxic effects at levels as high as 500 mg or 5,000 ppb.

Objectives for phenols or phenol equivalent should not exceed 5 ppb at any point in the receiving waters subsequent to initial dilution.

Cyanides

The recommended maximum limits for discharge of industrial wastes to sanitary sewers, storm sewers and natural watercourses containing cyanides (as HCN) are 2 ppm for sanitary sewers and 1 ppm for storm sewers or natural watercourses.

Total Kjeldahl Nitrogen

Total Kjeldahl nitrogen is the measure of the total nitrogenous material present as nitrate and nitrite nitrogen. The normal range for total Kjeldahl nitrogen is 0.1 to 0.5 ppm in natural watercourses. The presence of Kjeldahl nitrogen in water gives a good indication that the source of pollution occurs from organic matter.

SAMPLE RESULTS

It is noted that the sanitary chemical analyses and bacteriological examinations of samples collected from the sewer outfalls and surface drains show results greatly in excess of the water quality objectives.

Pollution Sources

The laboratory results of the samples collected indicate the following specific sources of pollution.

Industrial Outlets

T 150.4-I Morrow Screw and Nut Company Limited plant drain #4. This drain was found to be a serious source of pollution. As well as having an excessive BOD, suspended solids content and coliform count, fairly high concentrations of phenols were detected in the sample taken from this discharge.

- T 150.5-I
T 150.6-WI Morrow Screw and Nut Company Limited plant drains. Toxic wastes were present in the effluent leaving these drains. In addition a high BOD and suspended solids content were also present in excess of the maximum recommended limits.
- T 151.0-I Outlet from the Canadian Industries Limited result indicated an extremely high coliform count with suspended solids in excess of OWRC recommended objectives.
- TF 149.5-I The sample collected at the outlet from the Ingersoll Machine and Tool Company Limited revealed that the suspended solids of 49,544 ppm are highly in excess of the Commission's maximum objective of 15 ppm.
- T 149.6-I Borden Company Limited outfall for cooling water which is discharged directly to the Thames River. The BOD, suspended solids, and coliform organisms were in excess of the OWRC objectives.

Drains and Sewer Outfalls

- TCA 150.9-W A visual inspection of the effluent leaving this outlet located at Bell Street and Mackeand Street had a grey milky appearance and a characteristic sewage odour. The laboratory results indicated that this outlet is grossly polluted. It is apparent that this outlet is discharging sanitary sewage.
- TCA 150.8-W
TCB 150.41-W
TCD 151.1-W
TCX 149.57
TCX 149.58-W
TLY 150.49A
TCY 151.2-WT

Bacteriological examination of water samples collected from the listed

points revealed total coliform counts in excess of the OWRC objective of not greater than 2400 organisms per 100 ml.

Thames River

T 151.05
TF 149.4
TF 149.46
T 149.5
T 149.57

The analyses of samples collected at various points of the Thames River indicate an increase in coliform count as the river flows through the Town of Ingersoll. It was observed that heavy oil patches were present in the Thames River downstream from the Thames Street Bridge.

CONCLUSIONS

Domestic and industrial wastes produced in the Town of Ingersoll were being discharged without adequate treatment to the Thames River. This practice constitutes a violation of Section 27 of the Ontario Water Resources Commission Act which states:

"Every municipality or person that discharges or deposits or causes or permits the discharge or deposit of any material of any kind into or in any well, lake, river, pond, spring, stream, reservoir or other water or watercourse or on any shore or bank thereof or into or in any place that may impair the quality of the water of any well, lake, river, pond, spring, stream, reservoir or other water or watercourse is guilty of an offence and on summary conviction is liable to a fine of not more than \$1,000 or to imprisonment for a term of not more than one year, or to both".

SUMMARY

A municipal water pollution survey was conducted in the Town of Ingersoll on June 27, and 28, 1966.

A previous survey in the Town of Ingersoll was conducted on November 27, 1963. This survey revealed that sanitary and industrial wastes were being discharged into the Thames River and tributaries without adequate treatment.

Chemical analyses and bacteriological examination of the samples collected indicated that certain sections of the town are discharging inadequately treated wastes to local watercourses. The discharge of these polluting wastes to a watercourse is a contravention of the Ontario Water Resources Commission Act.

RECOMMENDATION

As a result of the findings of this survey, it is recommended that measures be taken to discontinue the discharge of sanitary and industrial wastes to storm sewers, surface water drains and watercourses within the Town of Ingersoll.

Approved by:


J.M. Timko, P.Eng.,
District Engineer,
Division of Sanitary Engineering.

bw

Prepared by:

D. Marchese

TABLE I
TOWN OF INGERSOLL - WATER POLLUTION SURVEY
SEWER OUTFALLS AND SURFACE WATER DRAINS

<u>Sample Number</u>	<u>Location of Sampling Points</u>	<u>Sampled</u>	<u>5-Day BOD</u> <u>(ppm)</u>	<u>SOLIDS</u> <u>Total Susp.</u> <u>(ppm)</u>	<u>Diss.</u> <u>(ppm)</u>	<u>Phenols</u> <u>(ppb)</u>	<u>Cyanide as HCN</u>	<u>Coliform Count per 100 c.c.</u>
<u>OUTFALLS TO NORTH BANK OF THAMES R.</u>								
T 149.55-T	WPCP Effluent	Nov. 27/63. Nov. 5/64. Sept. 28/65. June 27/66.	2.4 26.0 7.8 10.0	752 846 996 1046	4 12 10 9	748 834 986 1037	- - - -	750 - - -
TCA 150.8-W	East side of Bridge at Bell Street.	Nov. 23/63. June 27/66.	1.6 2.8	756 498	1 1	755 497	- -	29,000 51,000
TCA 150.9-W	West side of Mackeand St. and Bell Street.	Nov. 23/63. June 27/66.	17.0 310.0	706 794	54 246	652 558	- -	10,000 12,800,000
TCB 150.39-W	Corner of John and Victoria Streets.	June 27/66.	3.4	500	52	448	- -	290
TCB 150.41-W	Corner of Bell and John Streets.	June 27/66.	3.8	452	13	439	- -	57,000

TABLE I (Continued)

TOWN OF INGERSOLL - WATER POLLUTION SURVEY

SEWER OUTFALLS AND SURFACE WATER DRAINS

Sample Number	Location of Sampling Points	Date Sampled	SOLIDS				Phenols (ppb)	Cyanide as HCN	Coliform Count per 100 c.c.
			5-Day BOD (ppm)	Total Susp. (ppm)	Diss. (ppm)				
T 150.4-I	Morrow Screw and Nut Company Ltd. plant drain #4.	Nov. 23/63. June 27/66.	52.0 122.0	5104 2740	2256 724	2848 2016	8 20	0.6 0.0	10 13,900,000
T 150.5-I	Morrow Screw and Nut Company Ltd.	Nov. 23/63. May 27/65. June 27/66.	64.0 3.2 40.0	1094 508 698	119 26 52	975 682 646	15 20 -	55.0 -	300 -
TCD 151.6-WI	Morrow Screw and Nut Company Ltd.- West side of Creek on Carnegie Street.	Nov. 23/63. June 27/66.	23.0 106.0	802 790	34 132	768 658	12 2	18.0 14.7	550 <10
TCD 150.61-W	East side of creek at Carnegie and Mutual Street.	Nov. 23/63. May 27/65. June 27/66.	27.0 37.0 26.0	676 644 674	13 33 10	663 311 664	- - -	- - -	730,000 9,600,000 1,080
TCD 151.1-W	Outfall to creek at George and Waterloo Streets.	June 27/66.	2.6	410	6	404	-	-	9,000
T 151.0-I	Outfall to Thames River from C.I.L. Plant.	Nov. 23/63. June 27/66.	16.0 12.0	1444 880	857 38	1587 842	* Total Kjeldahl as N in Transit *18.2	-	1,280,000

TABLE I (Continued)

TOWN OF INGERSOLL - WATER POLLUTION SURVEYSEWER OUTFALLS AND SURFACE WATER DRAINS

<u>Sample Number</u>	<u>Location of Sampling Points</u>	<u>Date Sampled</u>	<u>5-Day BOD (ppm)</u>	<u>Total Susp. (ppm)</u>	<u>SOLIDS Diss. (ppm)</u>	<u>Phenols (ppb)</u>	<u>Cyanide as HCN</u>	<u>Coliform Count per 100 c.c.</u>	
TF 149.5-I	Outlet from Ingersoll Machine and Tool Company Limited.	Nov. 23/63. May 27/65. June 27/66.	10.0 3.0 3.0	602 558 49974 49544	12 1 430	590 557 430	9 20 2	- - -	33,000 - 170,000
TF 149.51-I	Outlet from R.S. Clark and Sons Limited.	June 27/66.	NO FLOW NOTED						
TF 149.54-I	Former course of Thames River at Refuse Disposal Area.	June 27/66.	4.8	330	6	324	-	-	186
<u>OUTFALLS TO THE SOUTH BANK OF THE THAMES RIVER</u>									
T 149.6-I	Outlet from Borden Co. Ltd. to Thames River.	Nov. 23/63. May 27/65. June 27/66.	4.0 360.0 44.0	476 696 570	2 93 34	474 603 536	- - -	- - -	25,300 - 262,000
TCX 149.57	Creek at CPR Culvert and Charles Streets.	Nov. 23/63. June 27/66.	450.0 2.5	1076 410	199 9	877 401	- -	- -	93,000,000 38,000

TABLE I (Continued)

TOWN OF INGERSOLL - WATER POLLUTION SURVEY

SEWER OUTFALLS AND SURFACE WATER DRAINS

Sample Number	Location of Sampling Points	Date Sampled	5-Day SOLIDS				Phenols (ppb)	Cyanide as HCN	Coliform Count per 100 c.c.
			BOD (ppm)	Total (ppm)	Susp. (ppm)	Diss. (ppm)			
TCX 149.58-W	Outlet to Charles and Merrit Streets.	Nov. 23/63. June 27/66.	1.4 3.0	634 690	4 14	630 676	-	-	3,500 122,000
TCX 150.5-W	Ann and Merrits Streets.	NO FLOW NOTED							
TCX 150.7-W	Wonham St. N.E. of Culvert near CPR tracks.	Nov. 23/63. June 27/66.	0.8 4.7	442 396	1 22	441 374	-	-	156 160
T 150.4-W	Thames Street S.W. Side of Bridge.	NO FLOW NOTED							
T 150.41-W	Thames Street at S.E. side of Bridge.	Nov. 23/63. June 27/66.	185.0 NO FLOW NOTED	760	46	714	-	-	290,000
TCY 150.49A	Creek at Charles and Thames Street.	Nov. 23/63. June 27/66.	NO FLOW NOTED 5.0	402	12	390	-	-	47,000
TCY 150.49B-W	Charles St. S.E. Side.	NO FLOW NOTED							

TABLE I (Continued)

TOWN OF INGERSOLL - WATER POLLUTION SURVEY
SEWER OUTFALLS AND SURFACE WATER DRAINS

<u>Sample Number</u>	<u>Location of Sampling Points</u>	<u>Date Sampled</u>	<u>5-Day BOD (ppm)</u>	<u>Total Susp. (ppm)</u>	<u>SOLIDS Diss. (ppm)</u>	<u>Phenols (ppb)</u>	<u>Cyanide as HCN</u>	<u>Coliform Count per 100 c.c.</u>
TCY 150.49C-W	Outlet to West Side of Creek and South of Charles Street.	NO FLOW NOTED						
TCY 150.49D-W	East Side of Creek and South of Charles Street.	NO FLOW NOTED						
TCY 150.62-W	Concession St. E. Side of Creek.	Nov. 23/63. Jun. 27/66.	14.0 6.4	436 410	21 17	415 393	- -	74,000 27,000
TCY 150.63A-W	Creek at Canterbury St. Bridge.	Nov. 23/63. June 27/66.	9.8 3.7	426 386	15 7	411 379	- -	9,000 1,400
TCY 150.63B-W	Canterbury St. N.E. of Bridge.	NO FLOW NOTED						
TCY 150.63C-W	Canterbury St. S.W. of Bridge.	NO FLOW NOTED						
TCY 150.9	Creek at Wellington St. Bridge.	June 27/66.	1.7	418	5	413	- -	1,600

TABLE I (Continued)

TOWN OF INGERSOLL - WATER POLLUTION SURVEY
SEWER OUTFALLS AND SURFACE WATER DRAINS

<u>Sample Number</u>	<u>Location of Sampling Points</u>	<u>Date Sampled</u>	<u>5-Day BOD (ppm)</u>	<u>Total (ppm)</u>	<u>SOLIDS</u> <u>Susp. (ppm)</u>	<u>Diss. (ppm)</u>	<u>Phenols (ppb)</u>	<u>Cyanide as HCN</u>	<u>Coliform Count per 100 c.c.</u>
TCY 150.91-W	Wellington Street S.E. of Culvert.	NO FLOW NOTED							
TCY 151.2-W	Outlet from West Side of Etna St.	Nov. 23/63. June 27/66.	165.0 19.0	1020 702	252 14	768 688	- -	- -	13,000,000 1,860,000
TCY 151.2-WT	Pumping Station Overflow at Etna St.	NO FLOW NOTED							
TCY 151.21-W	Outlet from East Side of Etna St.	NO FLOW NOTED							
T 150.9-W	Harriet St. Outlet to Thames R.	NO FLOW NOTED							
T 149.5	Thames R. below WPCP.	Nov. 23/63. June 27/66.	2.1 5.6	652 660	2 62	650 598	- 4	- -	14,000 710,000
T 149.57	Thames River above WPCP.	Nov. 23/63. June 27/66.	2.7 2.1	624 526	1 18	523 508	- -	- -	750 730

TABLE I (Continued)

TOWN OF INGERSOLL - WATER POLLUTION SURVEY

SEWER OUTFALLS AND SURFACE WATER DRAINS

<u>Sample Number</u>	<u>Location of Sampling Points</u>	<u>Date Sampled</u>	<u>5-Day BOD (ppm)</u>	<u>Total (ppm)</u>	<u>SOLIDS</u>		<u>Phenols (ppb)</u>	<u>Cyanide as HCN</u>	<u>Coliform Count per 100 c.c.</u>
T 151.05	Thames River upstream from C.I.L. Outlet.	June 27/66.	2.8	510	13	497	-	-	280
<u>OUTFALLS TO FORMER COURSE OF THE THAMES</u>									
TF 149.4	Junction of former course of Thames River and Thames River.	Nov. 23/63. June 27/66.	4.0 8.4	792 435	34 15	758 423	10.0 4.0	0.0 0.0	7,000 118,000
TF 149.46	Former course of Thames River downstream from Ingersoll Machine and Tool Company the R.S. Clark and Son Limited Outlet.	Nov. 23/63. Jun. 27/66.	5.6 2.9	778 366	213 7	555 359	10.0 2.0	0.6 -	6,100 690



ONTARIO WATER RESOURCES COMMISSION
TOWN OF INGERSOLL
 WATER POLLUTION SURVEY
 1966

SCALE: 600 0 600 1200 FT.
 DRAWN BY: A.L. DATE: SEPT. 1966
 CHECKED BY: DRAWING No. 66-59